



SPRFMO

South Pacific Regional Fisheries Management Organisation

8th MEETING OF THE SCIENTIFIC COMMITTEE

New Zealand, 3 to 8 October 2020

SC8-HM01

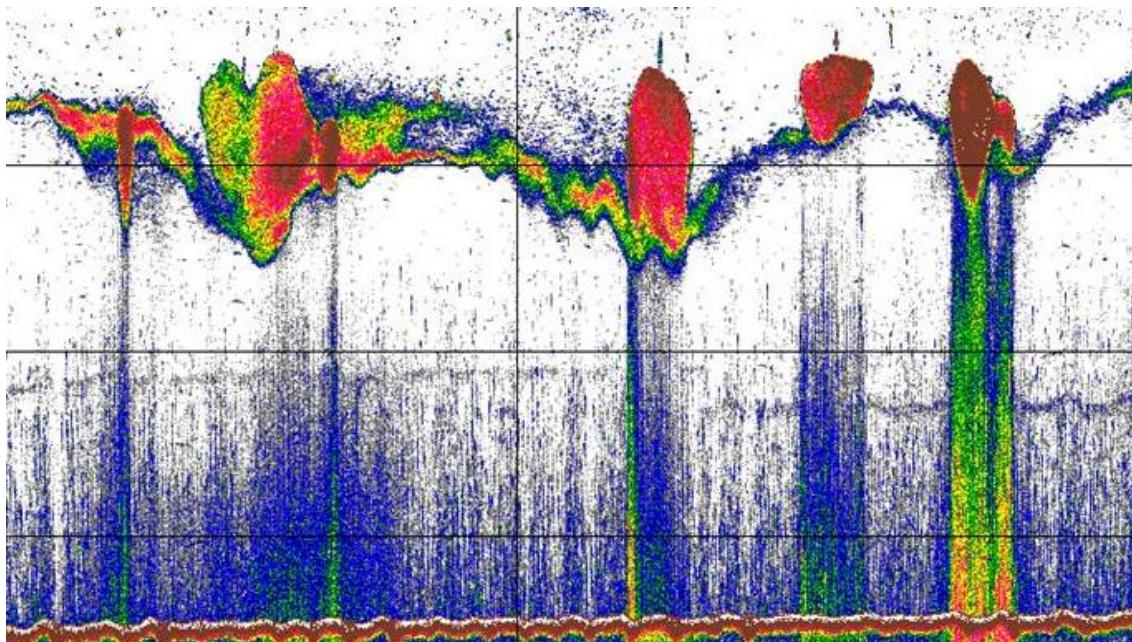
Existing environmental data for habitat studies

Peru

NATIONAL FISHERIES SOCIETY
HUMBOLDT INSTITUTE OF MARINE AND AQUACULTURE RESEARCH



**South Pacific Regional Fisheries Management Organization
8th Meeting of the Scientific Committee
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**Existing environmental data for habitat studies in the
Peruvian marine jurisdiction**

SCIENTIFIC RESEARCH COMMITTEE - SNP

September 2020

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HUMBOLDT INSTITUTE OF MARINE AND AQUACULTURE RESEARCH



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Introduction

Habitat monitoring intended to study the ecology of marine species demands the analysis of large data sets collected in several scales of time and space. In Peru, the Peruvian Sea Research Institute (IMARPE) has raised the most complete data sets on biological, ecological and oceanographic aspects since its foundation in 1964. The Eureka Program was the first continuous project founded by IMARPE to monitor fisheries and oceanic conditions using the fishing fleet as data collectors. In 1983 IMARPE launched the Pelagic Resources Research Program which included the periodic execution of acoustic surveys covering the entire national marine jurisdiction.

Relevant progress has also been made in Peru during the last decade regarding the use of commercial fishing vessels as platforms of opportunity for marine habitat and other environment-fishery related studies. Selected pelagic industrial fishing vessels that regularly fish for anchoveta, jack mackerel and chub mackerel have the capability of recording acoustic data with digitally calibrated echosounders. The data collected by these vessels is routinely analyzed by the fishing companies to be then shared with IMARPE, SNP, IHMA and academic entities during workshops.

Finally, it is noted that an increasing number of Peruvian commercial fishing vessels are collecting data on interactions with top predators, such as seabirds and marine mammals, which could contribute to characterize the habitat of pelagic species also from the high trophic level perspective.

In this brief document they will be listed the identified databases for the study of marine habitats in order to contribute to the promotion of cooperative links between research entities of the SPRFMO convention.

1. Satellite oceanographic data

Satellite oceanographic data is widely available in several internet platforms (e.g. Copernicus, NOAA, Oceanscolor etc). However IMARPE generates its own data using its Terascan Station. Data on several parameters is being collected since 1998 (www.imarpe.gob.pe) and includes:

- Sea Surface atmospheric pressure
 - Maps on atmospheric pressure and its anomalies
 - South Pacific Anticyclone index
- Winds
 - Maps on sea surface winds
- Sea surface temperature
 - Maps on sea Surface temperatura and anomalies
 - Peruvian coast thermal index
- Sea surface altimetry
 - Maps on sea surface altimetry and anomalies
 - Maps on mean sea surface level
- Marine currents
 - Maps of speed of currents
 - Maps of mean geostrophic speed
- Chlorophyll-a
 - Maps on chlorophyll-a

2. Oceanographic data

IMARPE performs several surveys annually on oceanic monitoring (since 1964) and fish stock assessment of pelagic and demersal resources (since 1983). All these are multidisciplinary surveys during which oceanographic data is collected in the Peruvian marine jurisdiction regarding numerous habitat components (www.imarpe.gob.pe) which includes:

- Physical oceanography
 - Sea temperature at different depth levels
 - Sea salinity at different depth levels
 - Ocean currents, vorticity and geostrophic fluxes
- Chemical oceanography
 - Dissolved oxygen at different depth levels
 - Chlorophyll-a at different depth levels
 - Nutrients (inorganic salts at different depth levels)
- Marine geology
 - Sea bottom bathymetry
 - Acoustic characterization of bottom type
- Biological oceanography
 - Phytoplankton communities at different depth levels.
 - Primary production at different depth levels
 - Zooplankton communities at different depth levels.
 - Secondary production at different depth levels
 - Benthos communities

3. Biological data

IMARPE performs several surveys annually on fish stock assessment of pelagic and demersal resources (since 1983). These are multidisciplinary surveys during which biological data is collected in the Peruvian marine jurisdiction regarding numerous habitat components (www.imarpe.gob.pe) which includes:

- Daily fisheries data (landings, CPUE etc) of all assessed species.
- Fishing sets logbook during surveys, species composition and size structure.
- Fish stock assessment data, including the main species like anchovy, hake, jumbo squid, jack mackerel, chub mackerel etc.
- Top predators data (sea birds, sea mammals, sea turtles etc).
- Spawning data on main fishing species (spawning fraction, spawning activity etc).
- Trophic ecology data of main fishing species (diet studies, trophic interactions etc).
- Recruitment indexes for the main species (anchovy, hake, jumbo squid, jack mackerel, chub mackerel etc.).
- Biodiversity indexes.

4. Acoustic data

IMARPE performs several surveys annually on fish stock assessment of pelagic and demersal resources (since 1983). These are multidisciplinary surveys during which acoustic data is collected in the Peruvian marine jurisdiction regarding numerous habitat components (www.imarpe.gob.pe) which includes:

- Acoustic biomass logbooks (1983-1997) by species: anchovy, sardine, jack mackerel and chub mackerel.

- Acoustic biomass logbooks (1997-1999) by species: anchovy, sardine, jack mackerel, chub mackerel, hake, vinciguerria, white anchovy, sea robin, jumbo squid, flying fish etc.
- Acoustic biomass logbooks (2000-2020) of macrozooplankton for 38 and 120 kHz.
- Acoustic data files (EK500) for 38 and 120 kHz for years 2000 to 2008.
- Acoustic data files (EK60) for 38, 120 and 200 kHz for years 2009 to 2016.
- Acoustic data files (EK80) for 18, 38, 70, 120 and 200 kHz for years 2017 to 2020.

5. Satellite Monitoring System (SISESAT)

The Ministry of Production (PRODUCE) performs permanent monitoring of industrial fishing activity through the Satellite Monitoring System of fishing vessels (SISESAT) since 1998. Currently the system produces a telegram data every 10 minutes by every vessel. Over 800 industry vessels of various industrial vessels are being monitored. Besides, over 400 artisan vessels of the jumbo squid fishery have been recently incorporated to the system. The SISESAT system includes:

- Vessel's name and code
- Date and time of every localization
- Date and time of the signal emission
- Latitude and longitude of every vessel position
- Course and speed of every vessel position

There is also an electronic logbook as provided in Supreme Decree D.S. 004-2016. Within the framework of this rule, the Skippers of the fishing vessels must inform in real time and mandatory about the size structure of their catches in every fishing set. The information contained in the electronic log is as follows:

- Vessel name
- Vessel code
- Initial date and time of fishing set
- End date and time of fishing set
- Fishing zone
- Latitude
- Longitude
- Catch
- Percentage of juvenile fish

6. Data collected aboard industrial fishing fleet

The fishing companies associated to SNP are collecting oceanic data and fishery information in the frame of the PESCADATA system (<http://ihma.org.pe/category/data/>). The data has been obtained within the Peruvian marine jurisdiction since 2011. That data includes the following:

- Acoustic biomass logbook of several species collected at 120 kHz during fishing seasons (ES60, ES70, ES80 systems).
 - Vessel name and code
 - Date and time
 - Longitude and latitude
 - Nautical Acoustic Scattering Coefficients (NASC) by species (anchovy, red squat lobster, jack mackerel, chub mackerel etc).
 - Fish school shape coefficients

- Acoustic biomass logbook of several species collected at 120 kHz during surveys in support of fish stock assessments made by IMARPE (ES60, ES70, ES80 systems).
 - Vessel name and code
 - Date and time
 - Longitude and latitude
 - Nautical Acoustic Scattering Coefficients (NASC) by species (anchovy, red squat lobster, jack mackerel, chub mackerel etc).
 - Fish school shape coefficients
- Acoustic data files (ES60, ES70, ES80 systems).
- Fishing sets by species and fishing seasons including fish size structure.
 - Vessel name and code
 - Date and time
 - Longitude and latitude
 - Catches
 - Fish size structure
- Top predators logbook of the CUIDAMAR, SALVAMAR and SIMAR Programs.
 - Vessel name and code
 - Date and time
 - Longitude and latitude
 - Species identified
 - Relative abundance index by species
- Vessel monitoring system data by vessels.
 - Vessel name and code
 - Date and time
 - Longitude and latitude
 - Speed and course

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